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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,960	03/25/2004	David J. Edlund	NPW 357	9804

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EXAMINER	
AUSTIN, MELISSA J	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/810,960	EDLUND ET AL.	
	Examiner	Art Unit	
	Melissa Austin	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-10,13,16,19,20,27-29,31,33-36 and 44-68* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-10,13,16,19,20,27-29,31,33-36 and 44-68* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-3, 6-10, 13, 16, 19, 20, 27-29, 31, 33-36, and 44-68 are pending in this application after the amendment submitted 15 April 2005.

Drawings

2. The drawings received 15 April 2005 are acceptable for examination purposes.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 7-10, 20, 27-29, 31, 33-35, 44, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338). Okamoto discloses a fuel cell system with a fuel processing assembly, including a steam reformer, adapted to produce hydrogen gas from at least one feed stream comprising a carbon-containing feedstock (methanol) and water. The fuel processing assembly may also include a hydrogen gas supply means, such as a hydrogen selective membrane or a pressure swing adsorption device (PSA), to remove components of the reformate such as unreformed methanol, carbon dioxide, nitrogen, water, etc. The fuel cell stack receives "only hydrogen gas" (that is, ~100% pure H_2) from the fuel processing assembly on the anode side and air from a

blower on the cathode side for the production of electric current. The anode and cathode exhaust streams are discharged through separators in which is produced a product water stream that is collected in a tank. (Col. 4, ll. 57-50, Col. 2, ll. 45- Col.3, ll.18; Col. 5, ll. 17-25; Fig. 1, 2, 3, 7, 10, 11). However, Okamoto fails to disclose an air delivery system for producing an oxygen-enriched stream. St-Pierre et al. disclose that a fuel cell system can achieve greater output voltages with concentrated or pure reactant streams because the presence of non-reactive components in the reactant streams can increase kinetic and mass transport losses in the fuel cell. Storage of pure reactants may be impractical, so hydrogen may be supplied by a reformer with carbon containing feedstock. Oxygen, typically supplied from air surrounding the fuel cell, and thus rather dilute because non-reactive nitrogen is the major component of the air, may be enriched by separating out components (nitrogen, argon, carbon dioxide, other impurities/pollutants, etc.) from the reactant stream in order to produce a stream that is more concentrated in the reactant. This separation may be done using a membrane in which the stream is passed over a membrane that is selectively permeable to oxygen. (Col. 2, ll. 30-66). Though not specifically stated, one of ordinary skill in the art would recognize that the separation would result in a stream consisting of the oxygen that passed though the membrane and a stream of the remaining air, now oxygen-depleted, and with a higher concentration of nitrogen. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have included in the fuel cell system as taught by Okamoto the reactant enrichment membrane for oxygen as taught by St-Pierre et al. in order to produce greater output voltages.

5. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338). Okamoto and St-Pierre together disclose the elements of claims 1 and 2 as discussed in the previous 35 U.S.C. 103 rejection and incorporated herein, but neither reference discloses the percentage the feed stream is composed of the product water stream from the water recovery assembly. It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the amount of water in the feed stream in order to provide the appropriate steam to carbon ratio in reformer of the fuel processing assembly, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Applicant has shown no criticality to the percentage of recycled water in the feed stream and absent a showing of such this rejection stands.

6. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338), and further in view of *Fuel Cell Systems*. Okamoto and St-Pierre together disclose the elements of claim 1 as discussed in the previous 35 U.S.C. 103 rejection and incorporated herein, but neither reference discloses the concentration of oxygen in the oxygen-enriched stream. *Fuel Cell Systems* teaches that oxygen enriched air streams may be produced from PSA or membrane systems. System optimization studies have shown a PSA system producing a 90% purity oxygen stream from air and a membrane-based system producing a 40% purity oxygen stream.

Air contains 21% oxygen by volume. An oxygen enriched stream having a concentration 50% greater than the concentration of oxygen gas in the air stream would contain: 0.21+0.5(0.21) = 0.315 or 31.5% oxygen.

Likewise, an oxygen enriched stream having a concentration 100% greater than the concentration of oxygen gas in the air stream would contain 42% oxygen. Either the PSA or membrane system would provide at minimum an oxygen-enriched stream containing 40% oxygen.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the fuel cell system as taught by Okamoto and St-Pierre et al. would produce the purity of at least 30%, at least 50%, and at least 75% oxygen (or an oxygen-enriched stream with an oxygen concentration of 50% or 100% greater than the oxygen concentration of the air stream) since it was known in the art that PSA and membrane systems provide oxygen streams of 90% and 40% purity, respectively, as taught by *Fuel Cell Systems.*

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338), and further in view of Appleby et al. (US 2001/0026884). Okamoto and St-Pierre et al. teach the elements of claim 1 as discussed in the above 35 USC 103 rejection and incorporated herein; however, neither Okamoto not St-Pierre disclose the product water recovered from the cathode exhaust delivered to a potable water supply.

Appleby teaches that astronauts used water recovered from fuel cells used to power the Gemini space missions as drinking water [0013].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the water recovered from the cathode exhaust of the fuel cell in the fuel cell system as taught by Okamoto and St-Pierre et al. was of high enough purity to serve as a source of potable water since it has been used for that purpose starting with the Gemini space missions in order to decrease the weight of water being carried in a portable fuel cell and decrease the amount of by-product released to the environment as taught by Appleby et al.

8. Claims 45, 46, 48, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338) and further in view of Ito (U.S. Patent No. 4,509,915). Okamoto and St-Pierre et al. together disclose the elements of claim 1 as discussed in the above 35 U.S.C. 103 rejection and incorporated herein, but neither reference discloses the use of the oxygen-enrichment assembly byproduct stream used to pressurize a supply of liquid fuel. Ito teaches that the nitrogen-enriched air from the oxygen-enriched air generating means (that includes an oxygen selective membrane) may be used to atomize liquid fuel (in this case, heavy oil, a carbon-containing feedstock). (Col. 1, ll. 57-Col. 2, ll. 19; Col. 3, ll. 46-56). One of ordinary skill in the art would recognize the advantage in using an existing high(er)-pressure process stream to pressurize another process stream based environmental, economic, and system efficiency factors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to pressurize a liquid fuel stream with the byproduct of the oxygen-enrichment system as taught by Ito in the fuel cell system as taught by Okamoto and St-

Pierre together in order to improve the system's environmental and economic factors and efficiency.

9. Claims 50-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338), and further in view of *Fuel Cell Systems*. Okamoto discloses a fuel cell system with a fuel processing assembly, including a steam reformer, adapted to produce hydrogen gas from at least one feed stream comprising a carbon-containing feedstock (methanol) and water. The fuel processing assembly may also include a hydrogen gas supply means, such as a hydrogen selective membrane or a pressure swing adsorption device (PSA), to remove components of the reformate such as unreformed methanol, carbon dioxide, nitrogen, water, etc. The fuel cell stack receives "only hydrogen gas" (that is, ~100% pure H_2) from the fuel processing assembly on the anode side and air from a blower on the cathode side for the production of electric current. The anode and cathode exhaust streams are discharged through separators in which is produced a product water stream that is collected in a tank. (Col. 4, ll. 57-50, Col. 2, ll. 45- Col.3, ll.18; Col. 5, ll. 17-25; Fig. 1, 2, 3, 7, 10, 11). However, Okamoto fails to disclose an air delivery system for producing an oxygen-enriched stream and providing a secondary stream of air.

St-Pierre et al. disclose that a fuel cell system can achieve greater output voltages with concentrated or pure reactant streams because the presence of non-reactive components in the reactant streams can increase kinetic and mass transport losses in the fuel cell. Storage of pure reactants may be impractical, so hydrogen may

be supplied by a reformer with carbon containing feedstock. Oxygen, typically supplied from air surrounding the fuel cell, and thus rather dilute because non-reactive nitrogen is the major component of the air, may be enriched by separating out components (nitrogen, argon, carbon dioxide, other impurities/pollutants, etc.) from the reactant stream in order to produce a stream that is more concentrated in the reactant. This separation may be done using a membrane in which the stream is passed over a membrane that is selectively permeable to oxygen. Though not specifically stated, one of ordinary skill in the art would recognize that the separation would result in a stream consisting of the oxygen that passed though the membrane and a stream of the remaining air, now oxygen-depleted, and with a higher concentration of nitrogen. The separation may also be effected by pressure swing adsorption, in which a gas component is separated from the stream by preferential adsorption onto a suitable adsorbent under pressure. (Col. 2, ll. 30-Col. 3, ll. 19). However, St-Pierre et al. do not disclose a secondary air stream.

Fuel Cell Systems teaches that air may be added to the oxygen-enriched stream to produce the desired oxygen concentration.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have included in the fuel cell system as taught by Okamoto the reactant enrichment membrane for oxygen as taught by St-Pierre et al. in order to produce greater output voltages and to add a secondary air stream to the oxygen-enriched stream in order to provide the desired oxygen concentration. One of ordinary skill in the art would realize that the secondary air stream could be provided to

the fuel cell separately or mixed with the oxygen-enriched stream and produce the same results.

10. Claims 58 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338), and further in view of *Fuel Cell Systems*. Okamoto, St-Pierre et al, and *Fuel Cell Systems* together teach the elements of claim 50 as discussed in the previous 35 U.S.C. 103 rejection and incorporated herein. Additionally, *Fuel Cell Systems* teaches that oxygen enriched air streams may be produced from PSA or membrane systems. System optimization studies have shown a PSA system producing a 90% purity oxygen stream from air and a membrane-based system producing a 40% purity oxygen stream.

Air contains 21% oxygen by volume. An oxygen enriched stream having a concentration 50% greater than the concentration of oxygen gas in the air stream would contain: $0.21+0.5(0.21) = 0.315$ or 31.5% oxygen.
Likewise, an oxygen enriched stream having a concentration 100% greater than the concentration of oxygen gas in the air stream would contain 42% oxygen. Either the PSA or membrane system would provide at minimum an oxygen-enriched stream containing 40% oxygen.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the fuel cell system as taught by Okamoto, St-Pierre et al., and *Fuel Cell Systems* together would produce the purity of at least 30%, at least 50%, and at least 75% oxygen (or an oxygen-enriched stream with an oxygen concentration of 50% or 100% greater than the oxygen concentration of the air stream)

since it was known in the art that PSA and membrane systems provide oxygen streams of 90% and 40% purity, respectively, as taught by *Fuel Cell Systems.*

11. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338) and *Fuel Cell Systems*, and further in view of Appleby et al. (US 2001/0026884). Okamoto, St-Pierre et al., and *Fuel Cell Systems* together teach the elements of claim 50 as discussed in the above 35 USC 103 rejection and incorporated herein; however, neither Okamoto nor St-Pierre disclose the product water recovered from the cathode exhaust delivered to a potable water supply.

Appleby teaches that astronauts used water recovered from fuel cells used to power the Gemini space missions as drinking water [0013].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the water recovered from the cathode exhaust of the fuel cell in the fuel cell system as taught by Okamoto and St-Pierre et al. was of high enough purity to serve as a source of potable water since it has been used for that purpose starting with the Gemini space missions in order to decrease the weight of water being carried in a portable fuel cell and decrease the amount of by-product released to the environment as taught by Appleby et al.

12. Claims 61-66 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338) and further in view of Ito (U.S. Patent No. 4,509,915). Okamoto discloses a fuel cell system with a fuel processing assembly, including a steam reformer, adapted to

produce hydrogen gas from at least one feed stream comprising a carbon-containing feedstock (methanol) and water. The fuel processing assembly may also include a hydrogen gas supply means, such as a hydrogen selective membrane or a pressure swing adsorption device (PSA), to remove components of the reformate such as unreformed methanol, carbon dioxide, nitrogen, water, etc. The fuel cell stack receives "only hydrogen gas" (that is, ~100% pure H_2) from the fuel processing assembly on the anode side and air from a blower on the cathode side for the production of electric current. The anode and cathode exhaust streams are discharged through separators in which is produced a product water stream that is collected in a tank. (Col. 4, ll. 57-50, Col. 2, ll. 45- Col.3, ll.18; Col. 5, ll. 17-25; Fig. 1, 2, 3, 7, 10, 11). However, Okamoto fails to disclose an air delivery system for producing an oxygen-enriched stream or a byproduct stream used to pressurize a supply of fuel.

St-Pierre et al. disclose that a fuel cell system can achieve greater output voltages with concentrated or pure reactant streams because the presence of non-reactive components in the reactant streams can increase kinetic and mass transport losses in the fuel cell. Storage of pure reactants may be impractical, so hydrogen may be supplied by a reformer with carbon containing feedstock. Oxygen, typically supplied from air surrounding the fuel cell, and thus rather dilute because non-reactive nitrogen is the major component of the air, may be enriched by separating out components (nitrogen, argon, carbon dioxide, other impurities/pollutants, etc.) from the reactant stream in order to produce a stream that is more concentrated in the reactant. This separation may be done using a membrane in which the stream is passed over a

membrane that is selectively permeable to oxygen. Though not specifically stated, one of ordinary skill in the art would recognize that the separation would result in a stream consisting of the oxygen that passed though the membrane and a stream of the remaining air, now oxygen-depleted, and with a higher concentration of nitrogen. The separation may also be effected by pressure swing adsorption, in which a gas component is separated from the stream by preferential adsorption onto a suitable adsorbent under pressure. (Col. 2, ll. 30-Col. 3, ll. 19). However, St-Pierre et al. do not disclose a byproduct stream used to pressurize a liquid fuel.

Ito teaches that the nitrogen-enriched air from the oxygen-enriched air generating means (that includes an oxygen selective membrane) may be used to atomize liquid fuel (in this case, heavy oil, a carbon-containing feedstock). (Col. 1, ll. 57-Col. 2, ll. 19; Col. 3, ll. 46-56). One of ordinary skill in the art would recognize the advantage in using an existing high(er)-pressure process stream to pressurize another process stream based environmental, economic, and system efficiency factors.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have included in the fuel cell system as taught by Okamoto the reactant enrichment system (membrane or pressure swing adsorption) for oxygen as taught by St-Pierre et al. in order to produce greater output voltages and to pressurize a liquid fuel stream with the byproduct of the oxygen-enrichment system as taught by Ito in the fuel cell system as taught by Okamoto and St-Pierre together in order to improve the system's environmental and economic factors and efficiency.

13. Claim 67 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 6,045,933) in view of St-Pierre et al. (U.S. Patent No. 6,627,338) and Ito (U.S. Patent No. 4,509,915) and further in view of Appleby et al. (US 2001/0026884). Okamoto, St-Pierre et al., and Ito together teach the elements of claim 61 as discussed in the above 35 USC 103 rejection and incorporated herein; however, none of the references disclose the product water recovered from the cathode exhaust delivered to a potable water supply.

Appleby teaches that astronauts used water recovered from fuel cells used to power the Gemini space missions as drinking water [0013].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the water recovered from the cathode exhaust of the fuel cell in the fuel cell system as taught by Okamoto, St-Pierre et al., and Ito was of high enough purity to serve as a source of potable water since it has been used for that purpose starting with the Gemini space missions in order to decrease the weight of water being carried in a portable fuel cell and decrease the amount of by-product released to the environment as taught by Appleby et al.

Double Patenting

14. Claims 45, 46, 48, 49, 61-65 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 4, 6-9, 11, 41, and 46 of copending Application No. 10/379,496. The conflicting claims of both applications claim a fuel processor producing a hydrogen gas

from a feedstock and an oxygen-selective membrane for oxygen enrichment that produces a byproduct stream used to pressurize a liquid fuel. The present claims are drawn to a fuel cell system including the assemblies above and a fuel cell stack while the claims of the conflicting application are drawn only to the fuel processing assembly. One of ordinary skill in the art at the time of invention would have recognized the fuel processing assembly as useful in a fuel cell system because it produces a hydrogen gas fuel.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

15. Applicant's arguments, see Remarks, filed 15 April 2005, with respect to the objection to the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn.

16. Applicant's arguments with respect to claims 27, 33-35, and 37 have been considered but are moot in view of applicant's amendment and the resulting new ground(s) of rejection.

17. Applicant's arguments with respect to claims 1-20, and 2-32, 36, and 38-43 have been considered but are moot in view of applicant's amendment and the resulting new ground(s) of rejection.

18. Applicant argues, Pg. 20, regarding claim 19, of Remarks, that it would not be obvious to modify Nitta with the teaching of Appleby regarding recovering water as a potable water supply. The argument states that the system as disclosed by Nitta would

require the entirety of the recovered water be supplied to the fuel processor in order to produce the required feed. This argument is not persuasive. Examiner finds no documentation that the system of Nitta requires that all recovered water be supplied to the fuel processor. Furthermore, the presence of a water tank (Fig. 10: 36) suggests that the recovery and supply are not of equal amounts (that is, tank in ≠ tank out). The excess recovered water remaining in the tank could be used as a potable water supply. This analysis would stand for any reference including a water recovery system with a holding tank that does not state that all water recovered is required by the fuel processing assembly.

19. Examiner appreciates Applicant's efforts in reviewing the lengthy specification for errors.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Austin whose telephone number is (571) 272-1247. The examiner can normally be reached on Monday - Thursday, alt. Friday, 7:15 AM - 4:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mja
Melissa Austin
Patent Examiner
Art Unit 1745

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER